

PCT

1EMKIHABIOPTAHII3A IBB  
mn lvr AIM110RCOBTBEm10GTHI"  
MawayaspomerelCove



IMIEXC YHAPOAFIAH 3AHBKA, OIIYBJI KOBAHHASI B COOTBETCTBH  
C ,1{OFOBOFOM 0 IIATEHTHOI KOONEPAMII3I3 (PCT)

)Mena yeaportyae arraccsltsa:autwt  
sao6pereas:e  
A61N15/06

(11) Hoaep rceacpytrapoga:o6 ay6maanaa: WO 96/25978  
AI (43) A<sup>B</sup>rameamyaapopnoti  
ay6u@cat ea: 29 army ra 1996 (29.08.96)

1) Homep neagyxaponnott a rnica: PCT/RU95/00211

2) Sara 116:1epyEapOnn0 t uuoAaaa:  
27 ceam6pa 1995(27.09.95)

0) jlae se o npnopwrere:  
95102749 24 4respaaa 1995(24.02.95) RU

1X72) 3aacarem. st aao6perareas: AJIbTIIYJIEP rpao-  
pa~ Eapecoaa4 (RU/RU); 96240 Caere-Ile 4p6ypr,  
IIymmscae mocce, A. 6, icopn. 1, xa. 97 (RU) [ALT-  
SHULER, Grigory Borisovich, St.Petersburg (RU)].

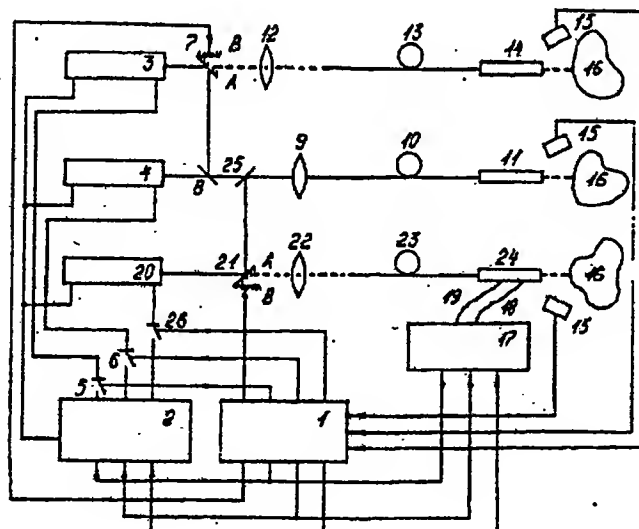
181) YxaMuarete rooyAapersa: AT, AU, BR, CA, CH, CN,  
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54) Title; DEVICE FOR USE IN THE LASER TREATMENT OF BIOLOGICAL TISSUE (VARIANTS THEREOF)

i4) Haasaaae a oobpereaaa:YCTPOfCTBO ,ILJla JIA3EPHOla OBPABOTXM BHOJIOTHFIECROf TRAHN (ErO  
,APHAHTiID



57) Abstract

The devices, comprising two or three pulser lasers (3, 4, 20), are provided with a system for the automated optimisation of the parameters pertaining to the radiation of the two lasers and to the type and method of treatment applied to each type of biological tissue. The outputs from at least one receiver (15) for receiving data on the condition of the biological tissue (16) being treated are connected to the inputs of the control unit (1) whose output signals are applied to electronic switches (5, 6, 8) incorporated in the links between each laser (3, 4, 20) and a power supply unit (2). The devices also include a controllable irrigation system (17) for irrigating the treatment zone and a mixing system for mixing the laser beams. The latter system empties reflecting mirrors (7, 21) and selectively reflecting mirrors (8, 25) and makes it possible to produce independent radiation outputs.

Orb!P•4)■p,rr


В *уCTpOI%CTBa*, **COCTOEI\$HC** *H3 ABTA* **NJIIH TpCX** HMIIynbCHWX na3epOB (3, 4, 20). B\$CAOHa CHCTCМа aBTOMATH'ICCKON OITHMH3auHH наpaMeTpOB H311yNCHHS 3THX J a3epDS. TH11Ob H pCZZHMOB o6pa6oTKH AIL9 Kaznom13 BHZa 6HOJ10111<sup>1</sup>*ICCKOA TKaHH*. BbIXOA61 XOTli 6u OAHOT'O npHCMHHKa fiHt4OpMaIUHH (15) o COCTOAHHH o6paбaммacuo i 6HOTKaniH (16) COCAHHCHЫ C EXOIIUMH 61noxа ynpaBncHHZ {1}. BWXOIIHWC CHrHaFLI KOTOpOTO Honiara Ha 9JICKTpOHhыC)CJ1109H (5. 6. 26), yCTAHOBиCHHыC B UCfAX COCIIHHCHHA Ka)IUIOCO na3epa (3, 4, 20) c 6noxoi нHTAHHA (2). B ycrpOrICTBa BKJnO'ICHbl TaX.)KC ynlpaWscMas CHCTCМаa . opowCHMI (17) 5oHb1 o6pa6oTlcH H CHCTCМа CMеWHBWHS H311)m6HHA na3CpOB, COCTOSWAR 113 OTpa\*aTcJlbHbIX 3CpKa11 (7, 21) H CCJICKTHBHО OTpa i(aTCJILHLU (3CpKAn (8, 25), npcfcycMaTpHBa[ol.uau BO3MOZ11OCTh H HC3altHCHMLIX BIXOIIOH H3J1y'ICHHYI.

HCIUIK!'IBTEAbHO!JUIA =J=Eft!HH.OPMALjHH

Kona|>rcnaarayaweJ,Jtto6oama<sup>9</sup>exu!crpax-who!PCT!na!myefiaa!inter=l6ponmp,la!=opwz  
nl6mikywrealicas~xapolua~!ammo!s!eochw!tersne!a!PCT.

AT Anemia  
AU Ascipaxxa  
BB **W**oe  
BE  
BF Symms 41sco  
BG Sam  
BJ \$aal  
BR  
CA Kalac  
CF llearpaJuatoatlHasicamas!

BY KIDpra  
CG nbelhapsul  
CH Knapp:  
CI Kant  
CM laog,soalyuni  
CN rra PKar6uoaes  
CS Tap  
DE  
DK  
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FR Caws=  
GA  e6guersina  
GN &Wpm  
GR Hpsalote  
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ЛАНКАТ  
Лактектитейн  
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Лонсебург  
Латаи  
Момано  
Медатаскар  
Мали  
Монголия

MX Maspstraanct  
MW  
NE llnrsP  
NL Hmnepsaings  
NO &pima  
NZ How wauc  
PL Mann  
PT Hamm!=  
RO Pyabnasa  
RU Pq slOeRept+t  
SD CIA  
SE  
SI Csomnia  
BK aann  
TO Jan u  
TG Torn  
UA Yxps=A  
IJ6 Col!lmau!Qirsrm  
UZ AmsplOal  
VN!Biencuc .a

eTpc!cTaaO J-ITili 3 n3epHOS1 06pa6crrKH  
6N0J101711eCKON TKaHH (OPO BapHAHTbi)

O6naCrb TCXHHKH

H306pCTCHHC OTIOCHTCA K MCAHUUHCKOH TCXHHXC H MOZCT 6brnb  
5 11 Cn011b3ODa110 B XHpyrTHH, OpTOneAHH H CTOMaTOForHH ARA o6pa6oTnH  
MArXHX H TBCpALIX 6HOJ1oflFYCKHX TKaHCN.

TipCAUICCTBy10111HH ypOBC111, TCXHHKH

H3BecTHO ycTpoicTB0 an o6pa(oTKH TKaHeH 3y6a Jla3CPHIM  
H31ly4CHHCM (naTCHT WO 90/01907. A6IC 5/00, AaTa ify6nHKawHH 08.03.90).  
10 coiepxcaluce nOCJICAObaTCJILio• pacnOJ10)ICCHHC BAOnb OTITH4CCKOH OCH  
HM1iyihCHb114 Jiaacp *HCPCACT60* AOCTaBKH H3J1y1CHHB K 3y6y. BXA104a10IUCe  
OTpe30K OTITHMCCKOTO *BOAOKHa*, BXOA KOTOporo OiITH4CCKH conpocCH C  
BLIXOAOM naacpa, H HaK011C4HHK, Bxo2 KoTOporl onTHYcCKH COnpA7KC11 c  
BLIXOAOM onTH'CCKOm BOJ1oKHa, a *Blaze*, ABIIACTCA 13L:XO310M *yeTpoHCTBa*.  
15 *IIPHCM*. B KA'ICCTBC naacpa MO)KCT 6Lrrb HCHOJ1.30Ba11 KSK HeOAHMOBL11i, TaK H  
rOnLMHeBL11. WDr 3p6HCBWN na3Cpu.

OCHOBHLIMIIICAOCT4TKOM AanHoro ycrpOHCTBa ABTIACTCH HCB03MO)KH OCTL  
61,ICTpOH 3aMeH11 mom na3epa Ha ApyroM B133BHCHMOCTH!OT THna  
06pa6aTWBaCM011 TKaH, a TaK)KC BLICOKa 1 onaCHOCTI, Hanccexxx *na3epHOH*  
20 TpaBMLL

H30ecr110 TaKXCe ilaiepr110C yCTpOicTBO AAA HC4CHH51 3y6OB, icOTOpoe  
ABnaCTCA JUIHCX11tC 6AH3KHM 110 TCXHHYCCKOH Cy111Y.oCTH H npHHATO 3a  
nparorxn (nareltT WO 90/12548, A 61C 5/00, Aapa• ny6nnKauil 01.11.90).

J 0 ycrpOHCTBO COACp)KHT CuicK ynpaljicilHA. Ana HMnyJILCHLIX na3epa.  
25 QUTH9CCKHC OCH KOTOpLiX napaAACJib1114, pacnO11o)KC1111WC 11a oflTH *ecKOH OCli*  
IVTOpOnd ilalepa. CiXIKyCHpy101ilylo CHCTCMY H OTpe30K OnTH4CCKOpo BOAOKtia C  
*Itaxotic'niHKOM*. Ha 011TH4CCKHM OCAX OCX1HX naiepou pacnOJ1ioAcem.,t fOA yrnOM  
45° K QCSIM 0 rrmecKH COnPA)KC1111LIC MC1K1y COCIOH, i oKyCHpyTOUICM CHCrCMOH  
H 011TH'CCKHM!BOJ10K1•UM 3epKaJ1a. 3cpKailo. paCHOHO)KC1110c Ha OCH nCpHOR)  
30 naicpa oTpacxaTCnbloe, a ua ocil, BToron) na3epa - AHXpOH4110C;  
'T.e.cenCKTHn10 OTpa)KaTC111,110c Ana AJIH114 *Buum* H31ly4enna nepnom na3cpa  
H npo3pa4HOe A1111!A11HH1.!!BOA11101!H311y4Ci1HA!BTOpom.

Ociow um HCAOCTaTKOM 11pOTOHna AW1CTC31 11CA(1LTaTO411aA  
At)N!ICKTHRHOC TL cm npfMC11CH1A npH PCpCXOAC OT pC)KHM a OAHOI O THna  
35 o6pa(crrKH K ApyrMy H ouaclocrt. mane-coma TpaBMLI, cnA3anna e  
OTCyrCTBHCM CHCTCMLI unpaCACHSI nnua o6pa6aThBacMOH TKaHH.

PSCKpLR'HC H306pCTCUHA

3ana4a. Ha peucilinc KOTOpOH iianpaluuenti 3aa1UIACMOC H3o6pernlc.  
3aKJ1104aCTCA It co3Aa11HH yCTpOHCl 11a UJD1 JaaCpiioil ofpa(oTKH 6H0110TH4CCKOH  
40 TKaHH, BLtnoJHataulero ix:e BHAW Jlaiepnwx'MCp 1HH B XHpyrHH, opTOneAHH  
H cTOMaT11nnrx. C 06CC11C'CHHCM npH 5• tTh( no3MC))KHuCTH 6WCTpelm nepexoAa  
OTIOAHOpO THna o6pa(nTKH K ApyrOMy H MH11HMaJ1W1011 14111a3HBHOCTH.

YKa3a1111asl iaila'la pCUJ3CTCA IpH OCY111eCTBUTeHH H306pCTCHHA 3a cyc7  
foCTHXCellHA TCXIM4CCK(WO pC3yJlrTaTa. 3aKJ1N14ammeroCit H OnTHMH7aUHL

pC)KNMo8 OGpaGOTKH H nap:we:rpou J1a3cp1lon) Irsly4cluix A1a1HCHMOCTH OT THfla O6pa6OTKH H BHJ1a 6HOJ1O rH4CCKON ?KAHN.

- YKa3aHHJIH TeXHH4CCKHH pe1y11bTaT Hph OCyUICCTWICIIHH H306pCTCHH2 AOCTHpaCTCA TEM. RIO B yCTpOFICTBO nnIA ia3Cpt101n o6pa6oTKH 6HOnorH4ecKort
- 5 TKaHH COACp KalUCC 6J1OK yflpali1CHHA, 8IdXOALi KOTopOro COCIIHHCHbI C 6nOKOM IIHTaHH 1 Jia3CpOB. HMnynLCHLIC naacpf4, OJTHMCCCKHC OCH KOTOpbIX napan1ICJ1bHb1. OIITH4CCKH COIIpHXCHHIUC OTpazaTCJ1bHOC 11 CCCKTHBHOC OTpa\*aTCnLHOCT JJ13 HaHIII 'mama =poor') Aa3cpa Et 11p03pa4Hoe UJA JJ1IHHb1 BOJ1Hb1 BTOPOTO J1a3Cpa 3cpKalla, ycpaHoact11114c Ha OCAX ncpnoro H BTOPOTO
- 10 J1a3Cpon COOTBCTACH10, yCTaIIOB1e111bIC Ha 011TH4eCK011 OCH BTOPOrO Aa3Cpa (OKyCCHpyIOWylo CHCTCMy H OIITHMCCCKOC BOJ1OKHO •C HaKOHCH4HHKOM. BLIXOJI KOTOPOrO 2BJ1WCTCA OIITH4CCKHM IIIA020M yCTpOAC1Aa, BI3CACH XOTA GLI OJ1HH 11pHCMHHK HIRI)OpMal1HH 0 COCTOAIIHH 6HOJ1OTH4CCK011 TKaHHH. BXO11 KOTOpolo COIIpA)KCH C MCCTOM ISO3ACHCTBHA Ha TKaHb. a ALIXOA COCAHIIICH C BXOAOM
- 15 GAOKII yllpammCHHI, BI1X0214 KOTOporo COCJ1HIIe111 C BXOAaMH BJICKTpOH11LIX Knio<sup>ec</sup>CH, yCTali06nei111 ix n UensX COCAHIIcIIH Kaxnor) na3epa a 6nOKOM ImTAIIHA. Orpa)lcaTCJ1IAOC 3CpKallt) \_ycTallonnc1u) C lu)3MO)KH0CTLI() nutsoJ1a CR) H7 X011a H3J1y4CHHA, a Ha )IITH4CCKOA OCH Iicp110n) J11nCpa II0CJ1ICJ1e)BaTCJ1b110 110 X021y H 111y4CIIHx pacno.noxtcn j tX)KycHpy101.uas CHCTCMA H OIITH4CCKOC
- 20 BOHOKHt) C HAK011C411HKOM. AbIXOa KOTOPOrO AI1J12CTCA IIpyCHM OHTH4CCKHM BLIXOAM' yCTpOHCTBa.

- £anCe 3t KTHBHOC yKa3a111b H TCXIIH4CCKHH pC3yJ1LTAT aOCTH1'aCTC31 TCM, 4TO A ycrpot'cTao aj1A . na3Cp11OH oGpa6oTxH 6Hnnorw ccKoi1. TKa11H, Coaepx(awec GJ1OK yllpali1CHHH, ALIXOU4 KOTOPOn1 COCaHIIcII4 C GnOKOM
- 2.5 11 TalIHA J1A3epOB, HMny11LCIIUC J1a'ICp14, OfTH4CCKHC OCH KOTOpbIX napantenw11. OIITH9CCKH COIIpH1KCHIIide OTp12iCaTCJ1IIIOC H CCJICKTHBHOC orpa EaTenIHC)e 1111WJUII1b1 ntuntbl nCpllt)m J1a9Cpa H 11ptripa411t)C 1U151 Juu1u,l A(n1lu,t B1)POn) J1a'ICpa 'ICpKalla, yCTailt)iUIC11114C 11a OCAX IIcpBOn) H BTOPOn) J1a3CpO11 COOTBCTC HCHHO, yCTa1101Ue111MC 11a tII't'H4COCOA OCH BTOPOn) J1aliepu
- 3.0 (Poxyclipy>outylt) CHCTCMy N 011TWICCKOC IuutoKHt) c IIaxo11C411HKOM, n1JXon KOTOPOn) 2BMCTCA OIITH4CCK11M BMX 0110M yC IX)11CTBa, BB1CaII TpCrHN HMflyJ1 cII11N JJ113Cp. OIITH4eCKaH OCb KOToporo napanileJ1t,1la OTITWICCKHM OCHM. J1tyX apyrHX na1epoB, a 1tu en) OCH yCTaIIonJ1C110 oTpaIcaTeJ1bHWC . 3epxallo, flpH4e.M OTpa3caTCJ1114114C 3CpXana yCTIKI1U1c1114 c w 1moxfle)cTbu) mamma mx
- 3.5 xoua H3ny4en'1A. .Ha 0IITU ICCKON OCH 11TOpon) 11a3Cpa 3a CCJICKTHJ111b1M 'ICpKaj1OM yCTaIIOB11CHo A'11)pOC CCJICKTHI1t) OTpaxc11TCJ1ibi0C AJ1A J11n111L1 A1)7111J TpCTLCC(1 J1uriepa 11 11ptYlp 41to : 11LW JUIH11J H(U1111i IICPI1011) H 11T0pOn) 111'3CpUA 3C0KWIO, 0IITH°1CCKH C1)11pA\*CI11OC C 0Tpa)IcaTcnb116IM 3CpX11110M, yCTaIdOI1Cn11LIM Ha OCH TpCTbCII) J1a3Cpa. C 4)tXyCHpy10WCN CNCTCMON H
- 4.0 BXOAOM O11TH4CCKOn) BOHOIC11a, paCUW10)KCII11JX Ha OCH BTOPOI't) J1a3cpa. KpOMC TOIL(), 1111 KU)KU01 It3 UCCA ITCpnozo H TpCTI.cn) na3Cp011 110CJ1CaO11aTCJ1II1O no xoay H3ny4CHHA pacno.11oxccHW tx)OKyCHpy10Wax CHCTCMA H OfITH4CCKOC BO11OK110 c 11aKO11C411HKOM. 111,1X0214 KOTOpb1X J1MA1OTe11 OIITHWICCKHMH AXOJJAMH ycTpo11Crna. YCTpol1CT11c1TaK\*CI11a6ECC1101XOTH1(iii

0111111M npHcM::HKOM1111141OpMaUHH10!COCTOZIHHH!61iO110rtxCKKOi!TxaIIIi.IBXOi  
KOTOp01'O!COnpAJKCIIC!MCCTOM!BO3ACHTBHB!Ha TKat1b, a BLIXOA coeatmCH C  
BXOAOM!6nOKa ynpatuieftwi. BLIXOALI xoTopopo COCAH!CHLI. c BXOBAMH  
3neXTpOHIILIX KJIIOYCH, yCTaII0131ICHHLIX BUICTEX COCAHHCHHA KaXCAOCO na3epa c

5 6noKoM naTaHHA.

1lpHCMHHK!MH1hXpMa11HH!C!COCTOAHHH 6Honont4ecKoi TxaIIIH Mo!zcT  
61rrb BLIn011HCH BBH11C CRCKTpOatla/IH3aTOpa B 06JJaCTH 200 - 1500 HM.,!BXOft  
xoiopopo oUTM4CCKH!CoIpAXCCI C MCCTOM!BO311CHCTBHA!IHHTKaHLK  
cOCTOXUuern143 BHCnepCHOHHOro 311eMCHTa, 11HHCKH I,CJTOACTCKTOPOB H  
10 311CMCHTa.cpan'IenHM.!HpHCMIMK!NW!OpMauKH!O!CO TOAHHH 6HMOTH!MCIO  
TKaHH Tax!KCI!MOXCCT 6l,wmn BLIn0JHCH H BHAC (JOTO3ICKTPH!ICCKOTO!RpnCMIIH\$a  
Htd!paKpaCHOr/) WUiyCHHA. BXOUXOTUpXIU ORTHYCKH cot1pEJKCH!C!MCCTOM  
Boiae CTBlisl Ha TKaIII, foCpCaCTNOM nonoporloru 3CpKarla, pacilunozeHilorc  
Ha ORTHYCKON OCH Jla3Cpa MCZKay B1.IXOAIIIM 3cpxanoM Jla3Cpa H  
15 IIUKyCHpyi uici; CHCTCM0il 4CpC3 4)HIIITp c noJIOCON nponycKatUtl,  
HCKAIOYaIOYICH!1101132ailHC!Ha!1lpHCMIIHK H3Jly4CI1HR na3Cpa.

!FpHCM)!MK. H11(c)OpMal1HH u!CUCTOHIIIH (IHOAO13YCcxofi TKaIII Mo7KCT  
GLITZ CWC BLpHUIHe11 It BHAC axyCTHYCKKoro!npHCMHHKa.!yCTah)OBIIICH110FC)  
TaKHM!O6pW OM. 'ITO IlailpalulelmC el%) MaKCIManbHUK!YyitCTUHTCJ1bt1OCT11  
20 COCTaBJIHT!C IlanpanncIIHCM otrnvieCKoi! OCii ila BxonC HaKOHCYHI!Ka yr0J1 a,  
yaOBJICTBopa10111HH yCII0BH10: I 1 °<a<86°

BACK TpOH11Jli XJIOY Mtj)KCH! 6JLITI 11(.11tor!ttCtt ii L'H,3C  
nonynpaiUII1HKU10111 11111 WICK TpOliaKyyMtol'n HCpCKJ1109alc1sl.

A01101111ITCJL110, yeTpOHTno cila(mtell( cHCTCMOH opouiCillisi 90i11.t  
25 o6pailoTKH, cocpoRUwwfi in petepityapa .am BOULI ItoasHILIM HacocoMlit  
It03A)IIIIIOO KoMIIpl:ccopa, cooTBeTepnyic)IIU1elnLIXOALIKOTOpL(X 06'l.CB 11 1141 1111 It  
tlaxor 11HKax HAUIUxtOTCxlHpplllra1mH(Iun,IM)i BIJXOauMil yCTpt) CTBa, a  
Bo3AyulH.IH!XOMnpeCCOp!B!Stec..7e COCAHICIIHA C110311)XO17p0\$UAAMii cna6:fccII  
a11CXTPOMaf1!UTJIIJMI KJlan:IIlaMH, nOAXJ1104enil1MH K nLIXOJlaM 6noKa  
30 yitpatuleIIHA iepc Jnililui 3anep KKH.

H3necTHO. tiro 3t~)t~CK3'Nlui()CTb JlaIephIOJ o6pafx)TKH 6HO11orwicoH  
TKaIIIH C OA1101tpCMCH1LiM 06CCHCYCHHeMIIHH3KUHIIHna314BIIIOCTH(cTCne11c1  
IIeKpO3a)3aIHCHT!OT!,MHIIb!•110111111H monument Jla3epIIOrO H3Jly'ic11HA.  
3HCprHH!H!HpCMCIH Jla3epIIUro B03JTCCTa11511t. JLitl HCKCITCpbIX B11110B TKalil,  
35 ZHAKOCTIIOrO opOluCHH11 7OHLI na3cpiofri O6pa6OTKH!(CM.,!HanpuMep,  
Proceeding of ... Laser-Tissue Interaction V 24-27. ,january 1994. Los  
Angeles, California Vol 2134A).

HCCJcm)Ail111lx, npmelte1111Je alcropoM, HoKa'i.11111, 'iio Hp11 :~Ttjm  
IIeofixo!IHM:I 0111lonpt;MCinlasi On33iMH'tali!ix yica'laliinix napaMerpu't ansi  
40 Ka)K1101'11BHua 6Ho1'KiHiii.FIIIMMit CJ1011aMII, HCofJxonitMhi:

1. BO3MUZHOCT1. Bbl6opa onTHMaJII.IIMX1.NJIIH!BOJZI!IIUTyTCIIHN!Jia3GpoluMIII!HX  
CMCCH,

2. *peflicrpauHn npauccea na,eptiotii AcCTpyKUiIH. BHAII H COCTOAHHA 6HOTKIIHH*  
*H ynpfB/CHF A AJIHHOil BOJIIILI, MOLLHOCTLIO, 3HeprHCH H BpCMCHCM na3Cp110P0*  
*ACHCTBHA.*
3. CHCTCMA Opowe) 3011111 *lia3ep110H* 06pa60TICH.
- 5 COBOXyTHOCTb BOCACHILIX B *ycrhoicTBO* XOTR 6Lr oAHOro npHCMHHKa  
 HH4OpMa11HH O COCTOAHHH o6paGaTbBaCMO4I 6HOJiorwlcexOlt TKaHH, BWXOA  
 xoroporo COCAHHCH C BXOAOM fuloxa ynpaEICHHA, H 311CKTpOHHLJX K<sub>n</sub>104CI,  
 yCTAHOBJICHHLIX B HCILAX THTAHHR *na3CpOB'H* ynpaBrRCMLIX BWXOAHLMH  
 rHilialtaMH 6110Ka ynpaBJicHHR. npCACTBB11810T C060N CHCTCMy 06paTHOli CBA3H.
- 10 KOTOpax o6Cne4HBacr ABTOMaTH4CCKHC *KOH'* rposU H OTITHMambHOC ynpaBJicHHC  
 napaMeTpaMH W ly'ICHHli na3CpOB B 3aBHCHMOCTH OT BHAII H COCTOAHHR  
 o6pnbamrBacMoli TKaHH H, TCM CAMLIM. O6CCnC<sup>y</sup>HBACT MHIIHManbHyIO  
 HHISa3HI)HocrL.
- 15 HC06XOAHMoCTL anTOMATH4CCKHX K0ln-pans H ynpaBJICHHA BW3BaHa  
 4aCT0 B03HHKIIIOWei HCB03MOJKIIIOCTLIO BH3yanbHOCO OnpCIIJCIIHHli Bpa90M  
 COCTOAHHA O6Jly'aCM0 % TKaHH H CC BHAA.
- HaJIH4HC ABYX IIC3allHCHMLix BLIXOAOB B OAHOM *yCTpONCTBe 6Jlaroiapn*  
*r103MO)KHocTH* BLtnona nrpa\*aTenbnurt) 3epKana H3 XOJJa n3nyYCHHA ncpiopa  
 Jlaicpa, a TaKMCC B03M0)Klform 'C MCI U Huai I li A H3ny9CHHli ABYX n r epon  
 20 noBwwacT' ;C \*KTHBHOC TL pa(x)TL, lipH 06pa6OTKC **CHOTKAHH.**
- Ha m%)He B on 'Tom ycTpOHC Tbc am cIGpaGoTKH CIIHOJOTH4CCKOlt TKaHH  
 TpcX *naJepOB* C pa3JIH'I11,IMH IUIHrUAMH Ball If H11ly'iCIHHH It HC3afHCHMGtMH  
 maxoABMH H . C B03MO)ICIIIOCTW) CMCIIHHBa11HN M3ny4eHHli 06CCrIC4HBaCT  
 1laH6nnn1.LHylo maim U,liocTb rlpHMCIIICIIHA yCTpOHCTBa H MaKCHMallbHO  
 25 pacwtips eT ero BtnMt) KITocTH. Hanpn1M(:p. npH OAIIOBPCMCHHOM B03ACHCTBH  
 R)J11.MIICBI,IM H IleouHM0131,IM naicpaMII la o6IyJ11(1 xponoIIaCldWeiiiwe Opra11LI  
 CIIHMat.Tcx onlacuacrb Kpt)lu)re4emu, npl 1IccaliKUHoiIHpoBalldoli nep4x)pailHr  
 KPytullIX Kp(NUIIOCIUwX COCyAOB, a C04CTAHHC H ii 3pHCBOru. Jla3epa C  
 HCOAHMOIIMM H rObMHCBbIM 9t KTHBil() npH O6pa()oTKC =flux **'Malta li**
- 30 TBCpALIX TKallCH 3y6a. *AJLa* CMCWHBa11H31 H311y4C}1HA TpcTLCrO naicpa C ABYMSI  
 ApyrHM11 WLH Ka)KIILIM H3 IHHX BBCACHW OTpaAUITCJILIIOC H CCJICKTHBHOC  
 3CPKaria. yCTa1IOAJICHHWC COOTtcrerIICIIIO Ha OCAX TpcCT1,000 H BTOpOra  
 na3epon. a B03MO)IAIOCTb BI4IK)Aa OTpaXCaTC:wb<sub>n</sub>11X 3CpKan in xona H3ny4CHMI H  
 HaJIH4HC AOflWIIIFITCJILIIILIX CxOKyCHpyIOWHX CHCTCM H C)HTH'icCKHX BOJ1YK011
- 35 o6eci,c' IHBACT IIC UBHCHMOCTb TpcX OHTH'ICCKI4X BKIXOAOB yCTpoiCTBa.
- AQnonnIlrTCJILIIIO BIIICACIIHall B yCTpnNCTIul CHCTCMA OpojCIHR,  
 ytlQa11TISlt;MaA 9JICKTpOMa11HT11WM)i KJlaIIILHaMH. II011KJII04CIIIIIMH K BbiXOAIIIM  
 (inoKa ynpalm CIIH3f OGeCIC IH1)aer orrrrt) LHblne Ca4CTaHHC pCXH Mots  
 0611y'ICIIHA H QpO111CIHSI TKAIH.
- 40 17U CBCACHHAM MITI)pa CO&)KpiNEWT b H3103KCHHbIX B tt)OpMynC  
 H7o6pCTe11HA npH3IIaKOB • AMACTCA IIo110II. a cam() TCXIIH4CCKOC pollen He  
 nn0BruCTropII CT KpHTCpliK) "H3n(SperaTeJII.CKHih yp011elib".

Kpar oe anncalule 4epTex(er

Cy111HOCTb WR)6peTCHHR noxcmx'eTCB Ha 4pH yrax, rite

4n1r.1 - H3o6paxac-r CXCMY ycrpo%cmma nix Jla3cpHO % o6pa6OTKH 6HOTKaHII.

4 3Hr.2 - CXCMY napHairTOB BbtfOnitCHHJI H pacnonO (CHHA npHCMHHKOB

5 H1HbOpMa11HH O CoCTOAHHH o6pa6aTLIBaCMOH 6moTxamH.

4Hr.3 - CXCMY ycTpoHcma npH HWIH<sup>M</sup>IHH Tpcx na3CpOb

430.4 - CHCTCMY HppHraluKH.

4,Hr.5 - 6aOK-cxeMy 6rioKa ynpatillCHHA.

YCTpoHCTBO JlnR na'epnoil o6pa6o7'xH 6HOnorH ccxoH TKaHH (4 Hr.1)

1.0 cocTOHT H3 6nox a ynpannCHHA I, cocaHHetmoro c HHM 6nox a nHTatn1R 2, HMnynbCHblx Jla3Cp011 3 H 4. COCLHICHIIIX C 6nOKOM fHTaHHA impel aJ1CKTPolrHW'e tJlIO<sup>4</sup>H 5 H 6. KOTOptae noaKnK)tielt,t K BbiXOnaM 6noKa ynpaLleHHA 1. Ha OnTH'4ecKHx ocxx na•lepon 3 H 4 pacnonoM(Clibl. COOTBCTBCHHU, uTpa\*aTcnlilloc *1CpK-JIO* 7 H CCACKTHBHOC 3CpXMo 8,

15 KOTOpbC OOTH<sup>4</sup>ICCKH COItpA)KCIIGI MC)Kay co6oH, 4t oKyCHpyloIII CN CHCTeMC '9 H Rr.IXOAlimM TOpUoM ofTH4ccKor) .noiiiox11a 10 c IlakoHC4HHKOM 11, pacrtonoM(CIIIIux Ha *onTH4ecxo%docu* na3cpa 4. CencrrHnItOe 3CpKaJio 8 oTpa)KaTenbilo JlnA H311y<sup>4</sup>CHHR C 1JiHIIIOJ( nonubl na3cpa 3,Ino npo3pa4110 JUTA H3ny4CHt1 CJUIHHON 1 O.111l,tJta3cpa 4. Pacno11oxtefnoe .ila ouTHdCCxoit OCH na3cpa 3 oTpaXaTent,IIor: 3epxanc) 7 IIonKJHo'idto x nbtxoay 6noKa yyTpalvlCHHA 1 H B ncuroxetuul A yCTallalunrtac1cB BOX yrlIUM 45° K OcH, a B nOMKCI111H B Ilapanncnbttn eH. Ha aTO<sup>4</sup> ixet nett iICJ1Ca 'la 1epKanOM II)CJteaOBaT:(nbll(1 1la XO1y H3ny<sup>4</sup>CIiHR paCII1OJIOZC111bl 4'loxyc{ipyioivaSI CHCTCMa 12 H OitTH4cCKOC BOJIOKUO 13 c ttaKUUC:411HxoM 14. K nxouy 6J Oxa ynpaltncHHSI 1 nouxniotreu 25 3iCKTPH<sup>4</sup>ICCKHH BbiXoa IlpHCMHHKa H114bx)pMa11HH O COCTOA11HH 6HoJIOpH<sup>4</sup>ICCKOH TKa11H 15. nxoi KOTOpOpO ConpA)l(CII C MCCruM IlolJlc%CTBHA Ha fHOTKaIIb 16. CmcTeMa HppHrC111H~r 17 11onKJIO<sup>4</sup>ICnIa K TCM)KC BI,Ixo,aM 6JloKa ynpanncmmx I. 9TO H 6nox turraHHM 2. a CC IK)aAUuf7 H IIOMY11.1111di *nioxOnbl* 18 11 19 o6i,cnuuctla n IlaxoIloIHHKC I 1 (14).

30 .11y4untii napuaur acyulcc•rnrncmi u•;u6pe<sup>r</sup>rcu1SI

Ha clmr.2 upacratuicll uapHat1T ycrptHeTlia c TlieIt na•tapaMH 3. 4. 20. Ha oi1Tli4ccKuui oclt Jla•;epa 20 ycpaiunrcun *inpax(aTenbHoe* lcpxau() 21. xfTOpnc Tax ACC, KaKH in' a'rCJtbnoc TCpKWii.7, IIoaKJUO'etio K 6noxy yllpalutetiHA I. H B luVIOMte11HH A yC'aHaIIIIHIIACTCA BOA yrlIOM 135° K OnTH4CCCKON OCH, a li fWIOM(CIIHH B napaiucniato CK. Ha ETON A(c OIITH4ccKO OCH paellOno)KCIibt 4#)OKyCHpyIOH1:WCHcTCMa 22 H fXOJLHOH TOpeu OitTH4ecKOTU Bonoxila 23 c ItaKO11C411HKOM 24. MC)K y 4poKyempyloaiel% CHCTCMOI 9 i4 CCJiCKT1tnIJbIM •tepKanoM yc-r lto1L1ein RTOpoe ccJICKTHImloe 3CpKanO 25. KOTOpC)C OitTH4CCKH ColI,pA)KCIIIO C TepKaJIOM 21, Z KyCHpylouterl CHCTCMOH 9 H BXOnnbIM TopUOM oITTH<sup>4</sup>ICCKUit) lionoKlfa 10. CCJICKTHBItoe 3cpKar10 25 OTpa):aTCnblo IU H't11y4C11HAC JlnHt1OH nuniii Jtalepa 20, no npoipa4110 n.n It371y<sup>4</sup>CIi{11{ 4 JUIIIaMH UoJlii Jla•3ep0B 3 N 4. BJlox 1111TAiiH5i 2 cocanrell c na3CpOM 20 4Cpc3 3BCKTPollub»a xnio4 26l.

- Pa311013HisIOCTIMH npHCM1HKa H114X pMailtH 15 0 COCTOAHHH GHOTKall  
**16 i.oyr** 611r1. **Kax** CnciTpOaltaIH3aTOp **27 (ciHr.3), Bawl** xOTOpO  
 ORTH'ICCKH conpAMcell C McCTOM 1103ACNCrthHA Ha 6HOTKaILL **16.** H 1(OTOpb111  
 COCTOHT H3 **AHCACpCH011110rO** 3IICMCHTZ **28.** AHuiCr%H dxYTOACTeXTOpOB **29.**  
**5 pacnonoxccHHOH** MCCT.0 COOTBCTCTByIOWCMY 0611aCrH AJIHII BOJIIr **200 -**  
**1500iIM** H 3110MCHTa cpaB **eHHA 30;** TaK M **4** OT0911CKTpH'CCKH i npHCMHHB  
 Hir(Ppaxpacnoro in.ny<sup>g</sup>CHHsi **3I,** OFTWICCKH COnpR)KCHLLri C MCCTOM  
 130311ciCrBHa Ha 6HUTX1aHb **16** JIOCPCACrBoM OITTH'ICCKOrO B011oxHa **13 (10, 23).**  
**4)OKyCHpyKOWCH** CHCTCMLI **12 (9. 22)** H fOBOPOTHOrO 3CpKJJla **32,**  
**10 pacnonozeHuoro McMCAy** tj,oxycHpyloweH cHCTCMOH **12 (9. 22)** H 3Cp?anoM A  
 Mnli HcnocpepneHHO nepeA Bi. xo bt, 3epKanoM **Aa3epa 3 (20).** 17epeA  
 OHTH'ICCKHM BXOAOM **11)OT03JICK1pH'leCKOC()** npHCMIIHKa **31** ycrail:Men  
 HHtf)paxpaculdi OVILTp **33.** nculoca nponyCKaHHW!Kolupum!HCKJAO'taCT  
 fcnaAaHHC IIII %k.,TO1rnCKTpH'1CCCKHH npHCM1HK **31** H3jiy'ICHHA .na3epa. B  
**15** Ka'iCCrTise npHCMIn n a 11114x)pMauHH **15** o COCTOM111tH GtonOrH9CCCKOH TKaHH **16**  
 MO)CCT 6LR6 H axvcru'CCKiiH tnpHCMHHK **34,** pacnono\*Cnm d% B6rmm ;Accra  
 BO3ACrCTBHA Itil TKailb. - TAK. MTU ttatlpxacHHCl-Jcr0 **MaxCHMWlw** OH  
 'yeCTBHCT11b11OCTH COCTaMAeT C OITtH4CCCKOH OCLIO H311y4CHHM Ha BLIXO11C  
 ilaxolle'1HHKa **11 (14. 24)** ynul a, JICKLIHHii n!lpenenax OT 11°11086°.  
**•20** B *CBA3H C TCM.* 'ITO 'INCJ10 npHCMIIHKOB Mnl4)OpMB11111 n!cocroAHHH  
 C)HOTKallH MO)KCT X0JICC)aTLCM C)T01111(01111b) ACIMTH (no Ka)KIIOMy BHAY. OKOJIO  
 KazA(nx)!naK0ne<sup>g</sup>iiHKa). XI H' a.-,I t) ItX(AC)0 Gnowa ynpanneliHM MOxct r)Lrrb  
 panlit) MCRRTH).  
 CHCTCMa 0p0n11c111t2 **30111.1** o6pa(cn\*KH ' **17.** Hro6pixcC1111as **lla!,(Hr.4**  
**25** cOCTOHT in!prscpnyapa nJIM 111111.1 II)AMILIM HaCUCOM **35.** K KOropOMy  
 npHcoc11Huella!noAonpoBOnsrulasl *Tpy6xa 18,* H lunaynulOn) KoMnpcccopa *3b.*  
*17pHCOCBM11ctJI101e* K 10311yHIIOMy KOMnpccOp *36* 1U) ) (0npcof011aultc  
*TpytxH 19 cna6xae;n,i* WleKTPOManHTHWMH KJlanallaMt **37..38. 39.** Kenop1,C  
 IU11KaIo'leHli K TeM MCC IILIXOAaM GnoKa yripalUetlira **1.** HTO i1 6n0K nHTatlfM **2.**  
**30** 'sepezlnHlHH 3a iCp,IKK **40.41.42.**  
 YcrpoHCrn0 pa6x)TaCT CfCAYloniHM 06pa'1)M. Fbny'Ienhls.naicpon **3. 4.**  
**20.** B Cny'ilce Itaxuxutelltl t)TpaMClrrutt►nLtx UEIK/III **7** H **21 n** 110MOXCIIHlt B.  
 upoliia (I)OKycipyloicnc cFlcTcMla **9. 12. 22,** trrpe um OHTH'ICCKHx i olicK0r1 **10,**  
**13. 23** H 11aKU11CN11HKH **1 J. 14. 24** IOCIyHalOT Ha aliTH'JCCCKHC BLIxOut.i  
**35** ycTpoi"icTba.  
 Ecnu **orpaxcarc.miali.lcliepxana** **7** li **21** Iraxousrca B nmno)fcC111IH **A.**  
 irsnycuuc ria3epa **3,** **OTpa3HB11HC1!OT** 3CpKaJla **7** nonanacr. Ha **CCACKTHM10C**  
 3cpaxa) **8** H. opalHIIIIHei, oT Helr). Itailpalul)ICTCM II110J11► 01TTWICCICOr1 OCT1  
 na\*scpa **4.** Ananunl4rul, upu Hammitt **Jla\*scpa** **20.** WUIy'it:hHC ;role) **Jlalcpa**  
**40** OTpa-iHBUIHCL OT **3Cpxalla** **21.a** 3arcM oT -cmc:KTHIMIOIO **3CpKWla** **25** TaKMce  
 HanpaicTcx!iln(sJll, unii'icckOH UCH **Jla\*scpa** **4.** B pc3ynt►TaTC,II **CBR1HICO**  
 CBOHCTb)M ccncKTHIIIIIX iCpKarl **8** II **25.** B (~c)KyCHpylwylII **chCTCMY** **9** If, TCM  
 CaMJ IM Ha OATH9CCCKHH 81,IX011 11aKOHC'itHKa II MOM nOCrynaTL H1J1y'JCIHR  
 nCCX Tpex Aa3ep011 0111io11pCMCn110.



- Bb16op BH11a 11pHCM11HKa Hncbx)pMauHH 15 o COCTOAHHH!6HorKalIH 16  
 3aBHCHT or BHJa TKarIH H!pC1CHMa!o6pa60TKH.la Tax)ICC. OT!BHAA HaxOHC4HHKa.  
 npH!pa6OTC!C!HCKO11TaKTHLIMH. 11aKOHe4HHXaMH OCHOBA9 4aCTb 313Jly4e.HHA  
*apomoniiro* t!JaxC11a, B0311HKa10wer0 H3-3a!CBC!4HHA!y!iaAACMbIX!iaCTH!  
 5 6HOTKallH!JICACTH!Is BHAHMOYt H!(JH1ICHNX yJibTpaCtHOJICTOBO! H Hur)paxpacHoH  
 o6naci x cnexrpa (200 - 1500tiM) H nMAerc9 npH4HH011!HCB03MO)KHOCTH  
 B143yallbiOro!Ha6J1TOACIHH!1H/1a!H!COCrOAHHA GHOTKaHH. CICKTpanibHLIN COCTaB  
 H31.y!CHM\$! 3posHOHHOro 4xu c3a 3a<sup>g</sup>r.CHT or BH.aa 6HOn aHH, noaTOMy  
 He06XOIHMH CncxpanbHWH aHaIH3!3rorn!Kanr!CHNA, KoropoC nonanaCT Ha  
 10 1HCHCpCH011HLa naneMCHT 28 CnCKTpOatannH3aToPa 27, pa!JiaaerCH!B Cne)tp H  
 nonauaCT Jla nHHetixy!cirooACTCKTapoB 29. COCAHlcllyO C!3JtCMC11TOM  
 cpanneliNA 30. Ypottellb Bbixont1010!raJICKTpH4CCKOFO CHnlaJia 3JiCMCiiTa  
 CpaB11C11HH3(!)COOTnCTCTnyCT!KinIKpCTIloll K<)M6H1IauIH AJIH1 tso.n cll!eKpa  
 H31y4CHNH p03H011110r1) ihaKC11a.BJIClap!H!CCKif CHrHaJ! OT 3JICMCHTa  
 15 CpaBiletiHA 30 Cr1CKTpOaIMH3aToPa 27 nocryiaet!Ha!BXOA!6no.a ylipaBTetiHA  
 1. CAC!Bbipa6ambinacis!C.NrttaJ!H3MCIIHHA!pCIKHMa!H3!1y4CHHH natcpoB.  
*Pa6opa c* KOITaKTH,IMH 1laK0HC413HXaMH CBA3aHa!C llarpCBa11HCM  
 J1a3Cp!LIM H31y4CHNCM T0pua paGo'iero H11CTpyMCHTa (ROIOKH ilIH  
 CailchnpOnb!i 1aKOHC4HHK) A0 onpeacnenilo! TCMiCpaTypU!aocTaTavilait nna  
 20 pa'pyieitiu 6HcTKanin. 1!arpcn - MCCra &IIBCNCCTBHA COApOBOX!aCTCS1  
 BOIHHK11OHCHHCHMH1!chpaxpaCilcn) H311y4CHHx,!XOTopoe!nepcaaCTCA no B01IOKH  
 ilaKOHC41HKa 11 (14. 24) H olpelxy OIITH4CCKop!1s0J1oK!ta 10 (13, 23) It  
 ilanpaHite tIHt. O(!paTHOM xony na3eplott) H3Jly!CIIHA. oTpa\*aeTcx ar  
 nonopcmlon) 3epxatla 32, npxnAHT HllfpaKpachLIN!ch11116Tp 33 H 11onaziacT na  
 25 ttUT0:9J1CKTpH9CCKHH!1pfCMiHK 31. arieKtpf4CCKH41 CHINa!l C Bb1XOA!  
 chOT05)11CKTpH4CCKort) npliCMiima 31 noCpynaCT B!6JiOK ynpaliMCIIHA 1. CAC n  
 3aBHCHMOCTH OT napaMC.tipOB Brow CHIIa l:1 iii,lpa6arl.inacrcw ClinlaJl:  
 OcraiioirxH!npOAIJI)KCIHR HJH N3MCIIHHA!pC\*HMil!paGOTb1 Ila3epa.  
 3KC1CpHMCIIJaTt,llo yCTa!)OMCIIO. 4Tt) TCIIJOBOC H3Ay4C111e.  
 30 IK1311HKa10111CC npH!lpa('OTC!C!K011raKT11bIMli HaxOHC4IHKaMH ItaXOAHTCA n  
 rny6OKOA NllrhaxpaCil!o arilacrii. B Bur<sup>g</sup> CranaCTH!iyncrnHrcnt,Hurril  
 (~)6)T0111CxpH4CCKHX ripHCM11HKO c)4cnb Maltu. CnCKTpall Ila<sup>g</sup> u(n 1CTb  
 H311y4CipHA Jla3CpCB TaK\*KCIJCXCIUT!B!HiuCl!paKpac1IUM tif3Ilacrii. noBTOMy!tIOJ1OCa  
 llpOITYCKallHR HllchpaxpachIoro tmH111,Tpa 33 CcM Hacona11a co cnCKTpajlbliOH  
 35 4yBCTnhiTCJ11.lloC1bK)4X)TONpHCMIIHKa 31...c OKIOM!nperipa41IOCTH!OIITH4CCxOr<)  
 Hnaox!ta 13 H!n&Ct!C!IHaaeT!HCK11104C11HC!nOllaaalnHA na chnonpiie.MHI!K 31  
 11111y1CHNA!na3cpn 3. 4. 20.  
 fpouyxl.1 na3eplio pa3pyWC11HR 6HOTKallii painc<sup>r</sup>ralorcx t0  
 CBCpX31syKOPOfi CKOpOCTHO. H!it CJICACrBHC pCSKOR)!HWMCHCIIHA Aa1slic11t1A Iri-3a  
 40 conpOTH1111CIIHA epeaLI rCHepHpyCTCH!axyCTH4CCKUA!IIIOJII:l. AjiA pa3r11!lub1X  
 TKallCA aMniunyua axyCTH!ICCKO BOIilhl!pu3fH41a. Amin) TyAa. axyCTH!1CCxc)ji  
 BONill.t perHCTpHpyCTCN aKyCTH4CCK34M!lipHCMIIHKOM 34, 3Jlexrpit4ecKHt  
 CHrllaJl C Koropopo TIOCTyrlaCT!Ha!6J11K!yrlpall1C1111A 1. me CHITC331pyCTCx  
 chntall Bpemiciti10H Ocrannnkif iiviy4cuns Wiii!t3M1IICIINx!pOKHMU!pa6x)Tbt

naacpa B 3azite1MOCTH a-r THia o6p:16am1naeMo% TKaHH HuH H cny'iac  
npCBI4111CHHA 9HeprHH na3eptlollo HMnynbca Han nopopoM p a3pyWeIIHA  
6HgrzaHH. 'ITO 1UIHACT Ha CTenellb na3cpHoro Hexpo3a.

- 11pexpaweHHe. a Cny'iac Hco6xoAHMOCTH, pC)XHMa H3Jty'1CHHA na3epoB B  
5 CoOTDCTCT nH C CHrJlaJlaMH CncXTpOaIIami3aTopa 27. 44oToJJICKTp31 ecKoro  
W1H azyCT VICCKOro np1CMHHKOli 31 H 34 npoHCxoni'i' C IIOM011b10  
6blerponeHci ytouwX HJlexTpontlix K4109CH 5, 6; '26. CHrHan c 6Jloxa  
ynpanrCHHa 1 nonacTC31 Ha ynlpaBaAtoulHN BXO aJCKTpOHHO O ICn104a 5, (6,  
26) pa3MwxaA UCnb nHTaH14A xa\*1101.0 H3 na3epoa. HpexpallcltHe HMnyJbca.  
10 H31ly'1CHH4 91txJICKT114110, CCJH BpCMA OTU110'1CHH11 nHTa1HR MCHLWC  
JUIHTCJlbHOCTH HMnynbca H34y9C1111A. (AJHTC11bHOCTb HMnynbca HJty'1CHH2  
MOZ T 6Lth 150 - 500 Mxcex.). flolrhoMy u xa'Iec-rw 3Jic1CTpollloro xnlo4a  
ao.nzCII Hcnt1Jlb3o1wrl cx: nemetrT *C BbICUKIIM* 61,1cnpoadicTnHCM. TaxHMH  
ynpaIm(eM1.1MH KJIK19aMH EURIOTCA nUS1y1IpO11O1111KODble HJH  
15 ::u1CKTUpouaiyyMlii,lc 11Cp&3UUt'la1'CJ111, BpCM7i Cpa6aTE,IliallHH KOTOpb4X VC  
npclSLIWicT 10() MKC.

- OpO111C111ne 6HcirKa11H c IIOMOWblo HppHra11HO11017 CHCTCMLI 17.  
rlpoHCX04HT C11C1tylo11111M O(pa3OM. *H3 pelcpRyapa* AJIR 130A1,r C 11o11Anb1M  
IcacOcoM 35 *nova 3anoJitlsCr* IulnollpononRutnc Tpy61H 18. B cny'tae  
20 11eOCxc11HMOCTH OpoWCIIHR TKall)t CHnianla N3 6nnxa ynpannCHHB 1 nocrynattrr  
Ha aJICKTpOMan1HTHraf x ianalt 37 (38, 39), KOTOp&IH OTKpb4DaCT HOCTy11JICHHC  
11ITIAyXa 1104 nawle11HeM in 11<sup>6</sup>311y11t11Oro KCIMripCCCUa 36 n no34yxenpo11012 19.  
KC»IUBI BUAU- H 1urinyxuupoiscwxHtnx Tpy(xn: 18 It 19 pacntlnuzclibt u  
liaxonc'ntnxax 11 (14, 24) TaK. 'iTi) nncnyrulclHc. f10111.1 Ha HppHtaalmo 1111c  
25 Dlxonr.l ycTpOHCTBa 11 01WX J111T 11pH rloua'IC 110311yxa 110 npltnlniny  
nynnepH3artpa.

- CHflaJ11.1 H3 6JInia ylipanliurnM I ntx.~ ynialln' Ila 3JICKTpt/Mar11HT1111e  
Knanaill.1 37 (38. 39) 'Icpc3 n1BIHH 3aUep)KKCH 40 (41. 42) OAHOpCMCIHO c  
CH111anaMH 3W1ycxa KMliyJ1LCI)IS rCliepaUHli Ha3CpOIS 3 (4. 20).  
30 Opa11C1111C 6HuTKa11H Isouorl 401O:1UO 11pt1NCXWIHTb a 11p0MC:Iy1KaX  
MC\*J1 HMnyJbCaaMH H1J1y'JC111t9 11:13Cpoll ( c 11C11.10 *H36C)KaTb* 11CZCJ1fTCn1fOC  
pacCCM111C iruiy'lt;tltR J1 11t1114CHTb ~cJ1c~x:Klin11r1CTL Opa111C11114 ). 11OBTomy  
1U11TCJ111OC •b 11pCMCHH 3 uepxu:H J1H11HH 3aJlepzKH 40 (41. 42) , panful .  
11pCMCIHION ,1J1HTCJ1r,lic1CTH HM11yJ11tY1n innycli)t3i J1aicptln C y'SCTOM ISpCMCI11i \_  
35 11OCTy11J1C11H31 Iu)3nyxa K KO11U1aM Tpy6UK 19.

11pBMCP x011KpCTHuri pCaT1H1aUHIi 3a1MACMbIX yCTpoHC.mI COCTOUT n  
cnenyluuLCM:

- Snort ynpatncnHN 1 (01r. 5) coCTOHT 1i3 ycHnlrcnsl BXOAIILX clinlanols  
C H11TCrpaTOpOM, flocbMitKa11aJ1b11c)ro JicC:ATHpaip2ntloro a11W1Oro-unr13pOIK)ro-  
40 npC06p83OaTCJ1J1I (ALM) C noCJ1c4c)ISaTW11.1314M H11TCpCJ1)CHCOM max 192 CepHH.  
npU1teccopa PC-104 Knap11C111M 1'Cliep:rrproM 11 BOCbM1iKa11W1b11oro  
TpHHa111aT1paipAUHo11 ItH1pptt-anaJ1b11u)1T1 r1pc.u6pa3uli;rrcilst (Uaf) . c  
n0CJ1CA0B3TCJ1 11b1M H11TCpCf)enC1dM max 540 cepim. Bblxouuble CHrHant4 LIAH  
1W1ICYCCJ1 814XO11aM1i 6JIOKa y11paIUC11110i 1. 110 TpCM H3 KOTOpbIX, K11uMe

cHtllanou 3anyexa NMnynbcoi rencpainHH.noc1yna1AT CHntalllL. onpeaeJlsx►WHe  
BCJIW1HHy ʸ1lcp1'NH HaKOIIHTCJILILIX KOtilelCaTOpOB drum mirami<sup>g</sup> 2.

- 5 B xa'IccTBe naaepos Hcnori63ycTCa 11a3epLI: Nd:YAG (\*lama swami  
1.06 MKM HIM 1.32MKM). Ho:YAG Omuta BOJHJI 2.09 MKM)H Er.YAG (IIJiHna  
nonHJI 2.94 MKAl). B xa'iccrnc JLHCncpcHOHHOTO 911cMCHTa 28-crex.nsiwHaa  
npH3Ma.. B Ka'1CC11e. ttXTt'OACTCKTOpOB 29!- KpCMHHCBMC nofynpOBOUIIHKOBLe  
t oTOAHOALI 431A-256. a a Ka'IeCTBC • 41oTOWICKpH'iCCKOpO npHCMHHKa  
H14paKpacHoro H311y4CHHR 31 . -rc<sup>P</sup>ManHe it (jx)TOHHOH X11-9. 3ncMCHT.  
CpaBHcHHA 30- .MHXpoCxeMa K554CA3 1inH LM-111. AKycrn9Ccxmi  
10 npHeMI(Hx 34 - MHKpO410H B&K4138..

11poML1IU1CHHa11 npHMCHHM0CTb

- TaxHM OCpaloM, npennaracMLte yctpoicTna. 3a c4CT COBOKy1111OCTH  
3atIBnACM10IX npH31naKOB. o6 elle'iHBat onepaTHBItoc ynpaBJeHHe, c  
1103Mn7K11OCTbIa 11apbHpollaIHS1 11 IIIHpOKoM nHaIMOnC napaMCTpaMll na3Cp}OI•(t  
15 Htny'teluHfl, 110711OJ1AltTr IlpOIIU1LHTL XHpyprH'IccKI a IlpO11CAypbl Ha 6HOTKaHAX B  
Ka'ICCTise JIHfied CKant.nW L. JIH60 KOaI PJIATopa. JINGO ACCTpyKTOpa B  
3aBHCHMOCTH OT Tpe6ycMLIX •THnytt.. pecHMofl H CO'iei a[iHli pa(oTLI J1a3epOB.  
opHeirrHponailil63x 1ta MHHHMa1H.1tyM1 .TpanUaTN'lltocTb npH nalltitl i BHAc  
UO3HCHCIBHt Ha Aaittyio CHoTxaln..

## 4opfeyjia iuo6pe euw

1. YCrpolICTBO NIA na,cpnoit 06pa6oTKH 6HOnorw ccKON TKaHHH, COACpKCa111CC 6JLOK ynpaluleHHA (1). BLIXOAW KOTOpOrO COCJIHHICHLt c 6nOK6M nHTaHHA (2) J1a3Cp0B. HMnynLCH11C n83CpL1 (3, 4), ORTH<sup>2</sup> CCKHC ocH KOTOpbIX
- 5 napaJfnCnbHLL. OTTHLICCKH COnp2ZCHHLIC OTpa)lCaTCnIHOC 3CpKan( (7) H CCJICKTHBHBO OTpaZaTCnLrloe Jinn n7IH1w B0JHla nepBOrO Jia3epa (3) tt npo3pa<sup>1</sup>iHOC.unfl JUIHHw BOuHw BTOpOpa na3epa (4) 3CpKanO (8). KOTOpb1C pac11cJ107IcCHLI Ha. OnTHHCCCKHX OWIX H1CpBOFO 'H BTOpOrc) J123CpOB COOTDeTCTBCHHO, ycTaHOMCHHLIC !la onTH'lecKOH ocH sroparo na3epa (4)
- 10 dOKyCHpyIO111y10 CHCTCMY (9). H onTH'icCKOC -OJ1OX110 (10) CHaxoHC'iltHKOM (11). BLIXOH zOTOpOrO AtJIACTCA onTH4ecx.HM BLIXOHOM yCTpOi CTBa. oTJ1H'laIoIu000A TCM, '1TO B nerO nac ie i XOTJi 61i own) nPHCMHHK Hilt)OpMaUHil (15) O COCTOAHHH (H011O'H'ICCKOH TxaliH • (16), nxon KC)TOpOrC) conp)OKcH c MCCTOM B03Aei CTBH Ha CHrrrKamm. (16), a BLIXOJI COCAHJCH C DXOHOM 6nox.
- 15 ynPaMCT'HSi C). BLIXtula KOTOpOT COCAHtelli c HxonaMII B.nCKTpOH11bIX xnio'1ci (5., 6). ycraonncrnu.ix n ucunx C0CJIHHCHHA Ka)Klaort) naaepa c 6JOKOM HHTaJii (2). xpQMe Toro; OTpazaTCJmIH)e 3cpicano (7) yCTallOMCHO t, B03MO)K11OCT1.10 BWBOAa Cr'l)H9 xona H3ny'fCilttA. a lia onTH'icCKOH ocH nCpBOrc) na3epa (3) nocncnonaTcnLUO nu xoay H'yly'icnit51 pacnonOxcella'4 OKyCHpyIOwa i
- 20 CHCTCma (12) H OrITH'lecxoc Iuuic)xno (13) C HaKOHIC41f IXOM (14), B11X0 KOTOpOrO RW2CTCA ApyHM OIrTH'icCKHM H1LIXUJ1OM yCTpOACTBa.
2. YCrpOIACT11t)J111J1 i1;llt:pftoM o6paroTNH (iHOJ10rH' eCXOH TKAHN. cOllcp)Kaulce 6nOK yllpaMcftrLM (I). nLXC)llra xoTopnra CoCJIHHICIUJ C 6nOXOM nitTaHHH (2) Ha3epun. H MilyJshetLU: Jfa•1Cp1.1 (3. 4. 20). anTH'iceXHC ocH
- 25 XUTnpblx HapaJ[neJ11lt.1. OHTI'icCKH col1pAXCcl11bIC OTpaiMCTeIH011OC 1Cp:aJ1t) (7) H CCJICKTHtut► oTpacxaru.iue JyH! aJHHM HW)Jtella 11Cplu)11) ))a3cpa (3) . H npcspa'1[1t)c HJDi Juiiin i• 'nun)! Inupoly na3cpa (4) •icpxivit) (8). x0-Tupi.1e pacnono\*Clw ua oilTHVCCK1tx OCAX ncpl1011) H BTaptm) J1a3Cpon cc)OTDeTCTielnu), ycTaioi icirnlac Ha OHTH4eCKi)H. ocH' ITOpOrt) naiepa (4).
- 30 t OtyCHpylo1tlylc) CHC CMY (<sup>2</sup>) H OHTH'lecKuC 110at)X11o (10) C 11aXOHC9PHHKOM (11). DLIXOH KO TOpOlt) AUIRCTCA OlrrHlea; HM Ii IXOHOM yCCpOHCTBa, OnHHAICHLICeC) TCM, ann. B Item Bnc acii Tpc rnii NMnyJf.etlb i J1a3Cp (20), onTH CKWI OCL KoTnpolu iiaPaJ1J1U11ta unrlivecKHM OcxM. altyx HpyHX J1aiep01i. yCTallt)IUC110 crrpa\*aTCJ11)11OC 3cpKaJio (21), npH'ICM OTpaWCaTCJ111Lic
- 35 3CpKana (7. 21) yCTalrunrCILL1 t: nenM))KHOCTLIO nlaltOlla HX H3 xona H311y4CIIHH. It Ha onTH'icCKOH JCH BTOpOH) J1aiepa (4) 3a L't;11eKTHHHaM, 3CpXa11OM (8) yciatiofuleiio BTOpC) C ACKTH11110 oTpa\*aTeJ161100 J1IH J1UHHI1 110J11I1 TpCTLCrO nalepa (20) H rlpCnpa'latx; Jinx Jutlin ROM! icpnoru H BTOpOH) J1a3CpOB (3, 4) 3cpxaftu (25) nnTH'lecxl Cortpax:citiuc c urpaxaTCJ1111IM 3epKanOM (21) ,
- 40 yCTallonneuMM Hla onTH'leexoil OcH TpeTb.efx) J1111Cpa (20). t)OKyCHpylo1t.uct CHCTCMort (9) n ItxOAoM101TWleei oro 110noxua (10). paCluono\*ciiiu rX Hla Oaf nropopOJ1a3cpa (4). laa iii ilt)ri tri ocei ucplu)IC) H 1pcTL.cru nalcpun (3. 20) Iioiiei1onaTCJ1111in no xoiy H3J1y'1e111H pacucuo aail.1 t n);ycilpylo1mui (12. 22) CHCTCma H of Th'icCKue HOJ1O alo (13. 23) a flaX011e'1111fKOM (14. 24). J1raxuu).1

**KOTOpUX** AafAIOTC31 ApyrHMH 011TH9CCKHMH BMXOlraMH yCTpOHCTna, cHa6xenHoro **TaXXCCIXOTA** 6m OAHHM npHCMHHKOM HH470pMaUHH (15) o cocTo **HHH.16HOITort19CCKO1iITKaTH(16)**, **BXOA** KOTOpOpo!CO11pA CH!CMCCTOM 803,\$CpICTBHA Ha 6HOTJCaHb (16), a **BLIXOA cOCAHHcii** c **BXOAOM** 6nox4 yllpaBJICHHA (1), **BbIXOAbI KOTfpCrO** COCAHHCHW C **BXOAOMI'JJICKTpOHbIX** xno4e % (5, 6, 26), ycranoMe iiLwx n utnxx cOCAHHCHHA KaRCAOpo na3epa (3, 4, 20) c 6noxoM MTaTHHA (2).

3. Ycrpocpico no n.1- 2. oTJI:IT'ialouiteca TCM. TM. npl!CMHHK HH4)OphalaHH (15) o COCTOAHHH **6HOiorH'lecKON** TKaHH (16) Bbinonnci a Brine **CnCKTpOatJiu3aTOpa** (27) a **06naCTH** 200 **HM!- 1500 HM**, **BXOA/KOTOpOpo** O11TH9CCKH cOnpAJKCH C MCCTOM 1103ACriCraHA Ha (HOTKau!(16). H cocroxlicrO HT aHC11CpCHOIIFlorO JJICMetra (28), nHICHKH ()OTOACTCKTOpOI (29) H 3neMeUTa CpaHHCHHa (30).

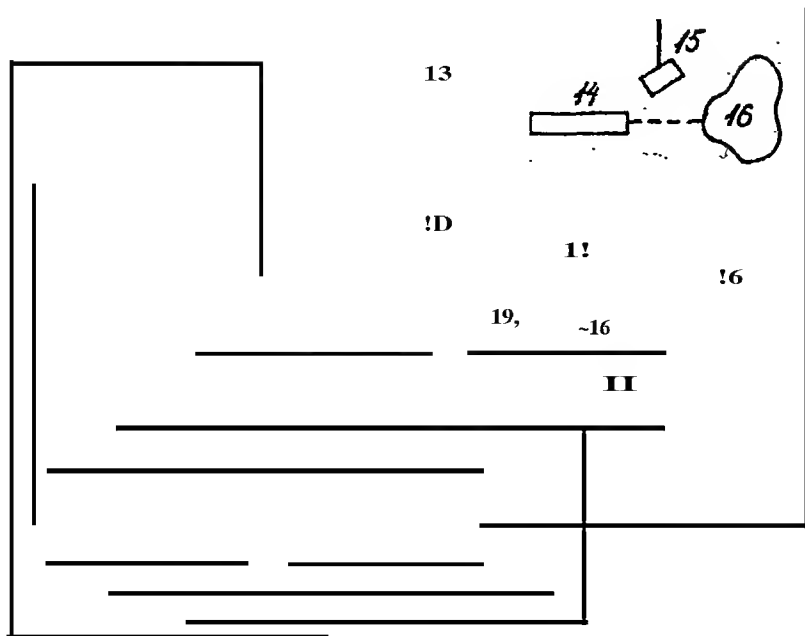
4. YcrpOHCT1y) no n. I, 2. OTJIH4auOUI000)1 TOM.ITO!npltcMHHK HIpOpMal1HH (15) O!cot.'TOAIHK!6HTUlt)rl!9CCKOpITKIIHH (1t1) iu.nninic11 n mutt 4)OToinCKTpH4ecKoro IlpHCM1 iKa (31) Hrr!paKpaCIIOTO 113Iy4CHHA. **BXOA** KOTOpOpo O11TH'ICCKH **COnpAMCCTIIC** MCCTOM!icnhICHCTBnx Ha 6HOTKaHb (16) nocpe cTaoM fonapOTOpo 3epKana (32). pacno.rnn crinoro Ira oni'wi :CKON OCH na,epa (3, 4, 20) Me cny **ifblxmtUIM** 3epKanoM naicpa (3. 4. 20) H 4-oxycnpyroieit CHCTCMOii (9. 12. 22) . 4epci (1)HR13Tp (33) a filont)coH npOncKaiIHR. **HCKn109calollac4** nunaaimc t'a 1pIICMI K (31) **if3ny4CHHA** nalcpa.

5. Ycrpocpcl)o no lr. I. 2. czTJIH'ralo Itcccx TOM. 9TO npHCMHHK HIIITx)pmalHH (15) o cocpOAlitH 6Htwoni'ICCKOH TKIIHH (16) ni.rnojicicn B aunt aKyCTH'ICCKOI'o IlpIICMIHKa (34). yeTallortnenIlorcl TaKHM o6palOM. 'ITO 11allpaluleliHe ell) M.IKCJImail moil 'fyncr;HTCnwicrlt cocraNIACr C HaripalurelmcM C)nTH4cCKOH!()CH tia nt.txone IlaK011c9tlmKa (11. 14. 24) yron a. **ynOMCT11opXI0IUHH** ycnomHlo:  $11^a < a < 86^0$  .-

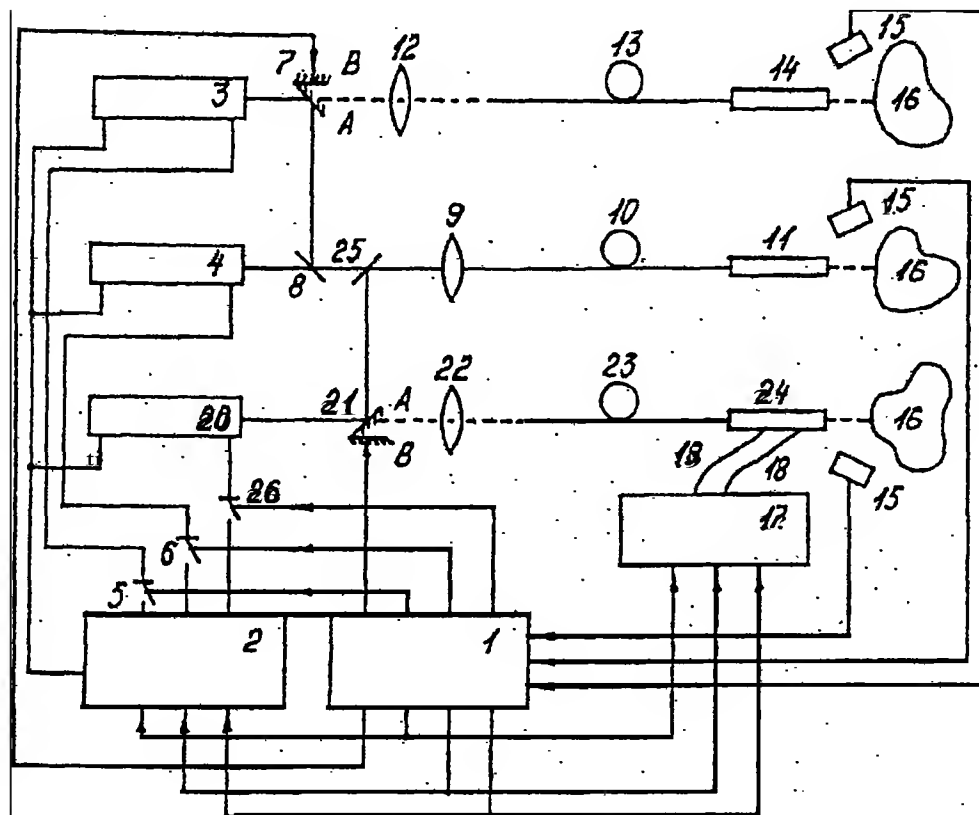
6. YCTpoiltmo!no It. 1.2. (rJIH9alO111CCCA TCM, 9TO B.IICKTpOIIrbIii )UUO'I (5, 6, 26) B1.InnniCn n **BHAL** ilwIynpolu)nlHKnnor) **HMI!9neKTportaKyyMIIOro** I1CpC1CJIJO'IUTCIAI.

7. YcrpOHCTIM) no ii. 1.. 2. crr:IIi'alnuicecs TCM, 9TO olio **AO1cu11IHTCJlblln** c1ra6mcelto **CHCTCMUH** (wirielihA (17), .coc7ciliileH **Hi** pcIcpnyapa **IIJIA** 130Afe1 C nourillmM tlacucoM (35) **•ti n rinyuuu)ru• xoolpcccopa** (36). cooTI Tcrnytoluic nmxcmbI (18. 19) xcroplax **t>61.enHulcUb1** li **HaK0Iic4IHKaX** (11. 14. 24) H miunnin'CA Hppinarmiuri1i.IMH **BLIXOnaMH** ycrpOHCTBa, a **1M)31iyLI1IbIii KOMIIpCCOp** (36) a **MCX.TC cOCA)IiICIUt** c no3UyXOnpwt02aMH (19) cta63,ccIr **Z)ACKTb)MatIHTIILIMH** K.AananaMH (37, 38, 39), **nOAKA104cIIIIIMH** **aMXOAaM** .6noxu **yripanncitla** (1) 9cpc3!JI IHII **3anCpxtKH** 40, 41.42.

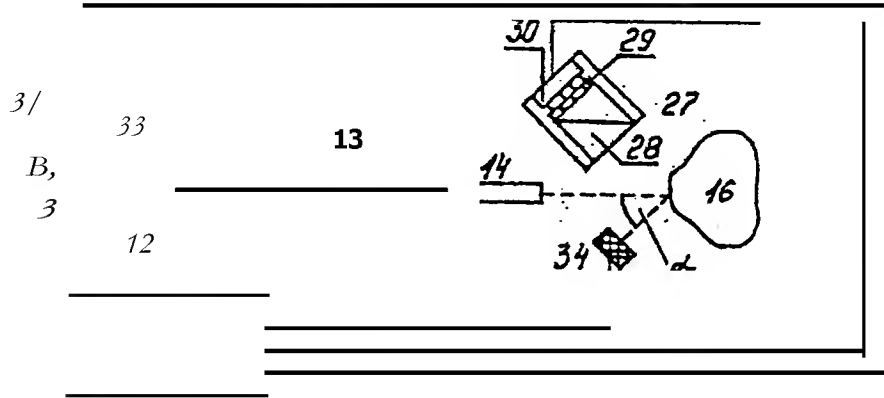
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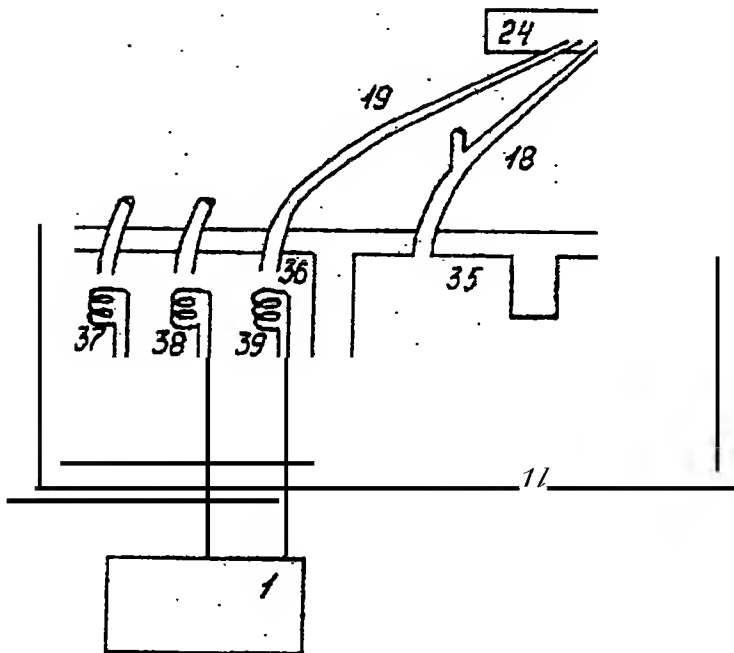
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## INTERNATIONAL! SET. 6! REPORT

ternational! application! No.

PCT/RU95L00211

## A. CLASSIFICATION OF SUBJECT MATTER

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## B. FIELDS SEARCHED

Minimum!docuoetatioe!searched!(classification!system!followed!by!classification!symbols)

IPC6:! A61N! 5/06,! A61B! 17/36,! A61C! 5/00

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Electronic!data!base!mnctlted!during!the!international!search!taame!of!data!base!and. where practicable!search!teens!used;

## C. DOCUMENTS! CONSIDERED! TO! BE! RELEVANT

Category'	Citation! of! document,! with! indication! where! appropriate! of! the! 'virtual! passages	Relevant! to! claim! No.
A	WO,! A1,90/12548! (VASSILIADIS,! ARTHUR! et! al), 01! November! 199.0! (01.11.90),! the! description, pages! 1,5-9,! Figs. 1-4.	1,3-7,2-7
A	EP,! A2,0429297! (HAMAMATSU! PHOTONICS! K.K) 29! May! 1991 (29.05.91),! the! description,! pages 1-5.! Figs. 1-4	1,3-7,2-7
A	EP,! A1,0320080! (DIAMANTOPOULOS,! COSTAS). 14! June! 1989! (14.06.89),! the! description,! pages 1,4-8, Fig. .4	1,3-7,2-7.
A	EP,! A1,0253734(SOCIETE! CIVILE! de! RECHERCHE! "SCR! RECHERCHES et DEVELOPPEMENT"),!20!January! 1988!(20.01.88)	1,3-7,2-7

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See!patent!fondly!annex.

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23! January! 1996! (23.01.96)

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## INTERNATIONAL SEARCH REPORT

International Application No.

PCVR119VfQ711t

C. (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category:	Oration of document, with Indiatioo, 'Mete appropriate, of the Mtwara puss sea	Relevant to daim No.
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A	SU, .A,! 4836203! (CARL-ZEISS-STIFTUNG) , 06! June! 1989! (06.06.89)	1,3-7,2-7
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A.KAACC!4MKAWta! nPERMETA!M30EPETEHRMR:!A61N!5/06  
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AeKcu!T!MKH-6:!A81N!5/06!A61B!17/36!A61C!5/00

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1 A WO, A1.90/12546(VASSILIADI:~. ARTH tr et 1.3-7.2-7  
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A U. A2.0429297 (HAMAMATSU PHOTONICS K.Y.T. 1.3-7.2-7  
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A EP.. AL.0320i:060 (DIAMANTOPOTJLOS.COSTAST. 1,3-':.2-7• 1  
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A EP. AL.0253734 ( OCIE TE CIVILE de!R CHE- 1.3- .2-? !!  
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Or= 0 KliZIMIAPOMOtI fI OHCKE

1' HexAYHap8AHafr!3AnbK9 Ho!  
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! c!\_! r rtponoxxe

LOKymbHTEIE,!C<sup>2</sup>MTAIOM!tEc.S!PEAEBAHTHUMH

V.b.T rO-E CCW 311 Hb~JIORY l&HTU. Olyx&:►&x11tF>K. rae '9TO1CiTHOO•HT R  
,pHs ) FsOtMOYH,. peXeErb.HTRUX '#sCTFR 1JfJfITY Ncr./

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